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**Is There a Relationship between the Gender of the CEO and Short-Terminism
or Long-Terminism?**

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Is there a relationship between the gender of the CEO and short-termism or long-termism?

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Sacred Heart University, July 2020

"Corporations that stay successful over time tend to be driven by goals and principles other than shareholder returns." Jim Collins, author of Good to Great

Abstract:

Based on a panel of S&P 1500 firms from the period of 2008-2016, we evaluate whether firms managed by female CEOs exhibit the same short-termism or long-termism as firms managed by male CEOs. We evaluate in terms of market based, firm based and investment indicator. Our goal is to better understand if there is a relationship between the gender of the CEO and short-termism or long-termism.

Our results find firms with female CEOs have lower Tobin's Q, lower ROA, however, they spend more on research and development than firms run by male CEOs.

Keywords: Gender, Short-termism, Long-termism

Introduction:

This past decade we saw women appointed to the CEO role at Oracle, General Motors, IBM, Lockheed Martin, J.C. Penny, Hershey, Williams Sonoma, Best Buy, and Northrop Grumman. (Catalyst, 2020).

CEO Mary Barra of General Motors provides relevance to the issue of short-termism vs. long-termism. In a 2018 press release, CEO Barra found herself explaining why the announced plant closings and salary reductions were not stop-gap measures for quarterly results but repositioning GM for the future. She went on to explain the future includes more electric vehicles and driver-assist, GM needs to spend billions on developing and manufacturing those vehicles. (Huston-Rough, 2018) The speed of technological advancements magnifies her decision to focus on development and repositioning and a long-term approach. In this paper, we study whether long term orientation by a female CEO is anecdotal or a trend.

According to the Pew Research Center, in 2017, female CEOs represented only 5.1% of the Standard & Poor's (S&P) 1500 (Desilver, 2018). Female CEOs continue to be an exception to the norm. Promising data presented by the Graduate Management Admission Council shows that the number of females graduating with MBAs is at an all-time high (Bruggeman & Chan, 2016). Given the increase in MBAs and the empirical research supporting female representation contributes to more effective decision making and better company performance, we would expect to see more female CEOs. (Campbell & Minguez, 2008) Scholarly research and professional literature have explored gender topics extensively. Gender studies span topics from compensation, governance, overall employee diversity, executive leadership, and behavioral studies, including leadership styles and risk preferences.¹ Many of these studies aim to provide insight as to the reason we do not see more women in the c-suite. While most of these studies explain the

¹ The published research on gender students is extensive (Adams, et al., 2009; Adler, 1993; Appelbaum, et al., 2003; Campbell, Minguez, 2008; Campbell & Minguez, 2010; Christiansen et al., 2016; Dezso & Ross, 2011; Faccio, et al., 2016; Noland, et al., 2016; Adler, 2001) for further details.

reasons behind the low number of female CEOs, our paper studies the consequences of female leadership.

We seek to understand the relationship between short-term performance, long-term performance, and investment in the future as measured by research and development and gender of the CEO. Our goal is to understand better if there is a relationship between the gender of the CEO and short-termism or long-termism. We define short-termism as the "decision and outcomes that pursue a course of action that is best for the short term but suboptimal over the long run" (Laverty, 1996). Corporate short-termism is harmful to companies because it encourages short-term profit maximization, compromising long-term value creation. (Jensen & Meckling, 1979; Marginson & McAulay, 2008)

There is an expanding stream of literature from economists, and financial and accounting researchers studying short-termism.² There is an interesting debate in the literature challenging corporate governance to explore the balance between shareholder centered management versus company centered management. Company executives should focus and be rewarded for their long-term decisions such as investments in expanded or new businesses or lines of services, sacrificing the short-term profitability for the expectation of growth and higher earnings in the future. (Laverty, 1996)

This paper seeks to expand the literature by exploring the intersection of these topics and fill a gap by examining if there is a relationship between gender of the CEO and long-term or short-term decision making in S&P 1500. Despite the recent attention in scholarly and practitioner literature to short-termism, the

² Examples of literature of short-termism (Barton, et al., 2017; Brochet, et al., 2015; DesJardine, 2016; Laverty, 1996; Marginson & McAulay, 2008; Olesinski, et al., 2014).

balance between shareholder centered management versus company centered management, and the infrequency of women in the c-suite even with a pipeline of women earning MBAs, yet the CEO role is still reserved for men. This creates a need for empirical attention. We conclude that female CEOs are being unfairly judged by the market. We find, companies led by female CEOs have lower Tobin's Q and lower ROA, however, they spend more on research and development than male CEOs of S&P 1500 companies. This suggests that female CEOs are more long-term oriented despite the market undervaluing their companies, and they assume CEO roles in lower-performing firms.

The rest of the paper is organized as follows. Section 2 discusses the literature review. Section 3 describes the research question and hypotheses. Section 4 explains the research methodology, performance measurements, descriptive and summary statistics. Section 5 explains the results, and Section 6 presents the conclusion.

2. Literature review:

We organize the literature review into three main categories: short-term versus long-term findings, gender-based findings, and performance measurements.

2.1 Short-termism versus long-term findings

We define short-termism as the "decision and outcomes that pursue a course of action that is best for the short term but suboptimal over the long run" (Laverty, 1996). An interchangeable term for corporate short-termism is managerial myopia defined as "managerial behavior focused on improving earnings in the short term at the expense of long-term growth." (Samuel, 2000) Laverty defines myopia as "as characteristic of a decision that overvalues short-term rewards and undervalues long term consequences."

Maximizing shareholder wealth is the goal of all publicly traded companies (Jensen & Meckling, 1979); short-term results must be achieved for a company to survive. Long term stability provides maximization of shareholder wealth long term. This debate has been at the heart of short-termism literature. (Lavery, 1996; Porter & Wayland, 1992) A recent practitioner whitepaper, published by McKinsey, found empirical evidence that companies with a long-termism approach dramatically outperformed those with a short-termism approach.³ The study created a systematic measurement of the short-term and long-term, creating a proprietary Corporate Horizon Index. Their findings show that long-term firms that spend on average 50% more on R&D had 47% higher revenue growth and 36% higher earnings growth as compared with the short term firms. (Barton, et al., 2017) Corporate short-termism is harmful to companies because it encourages short-term profit maximization, compromising long-term value creation. (Jensen & Meckling, 1979; Marginson & McAulay, 2008) This can be demonstrated by a company's decision to delay investments in R&D and innovation to bolster a company's short-term profits. The literature supports the finding that short-termism is negatively impacting economic growth, job creation, and impeding innovation for the economy. (Samuel, 2000; Terry, 2015) This notion is confirmed by the empirical findings of the McKinsey study, that concluded if all public U.S. companies had created jobs at the scale of the long-term focused companies in their sample, the country would have generated at least five million more jobs from 2001-2015 and an additional \$1 trillion in GDP growth. If this trend continued, this could result in nearly \$3 trillion of forgone GDP through 2025. (Barton et al., 2017) This notion was expanded

³ Barton, et al., 2017, Measuring the Economic Impact of Short-termism, *McKinsey Global Institute*.

upon in a practitioner report prepared by EY Poland (2014) analyzing short-termism: causes, mechanisms, and consequences. This study defines short-termism as actions leading to long-term benefits that require short-term sacrifices. They suggest short-termism as being at the root of the financial crisis. Financial institutions took on excessive risk to maximize short-term earnings, concluding that short-termism may lead to macroeconomic imbalances followed by sudden economic downturns. (Olesinski et al., 2014) This gets to the very heart of the importance of the issue of long-termism vs. short-termism.

2.2 Gender-based findings

There have been numerous studies exploring gender relative to earnings, performance, board composition, and risk tendencies. The results of several studies empirically show gender diversity in the boardroom and representation in top management has a positive impact on firm value.⁴ According to Faccio et al. (2016), CEO gender significantly affects corporate risk-taking choices. Women CEOs are more risk-averse than male CEOs. Firms run by female CEOs make less risky organizational choices. They avoid risky projects with a positive expected net present value that would reduce the efficiency of the capital allocation process. (Faccio et al., 2016)

The 'glass cliff' (Ryan & Haslam, 2007) suggests that women are more likely than men to be appointed as leaders in times of poor company performance. According to their work, women assumed emotional sensitivity, relational style, and interpersonal skills, which might be more highly valued in struggling organizations that face difficult personnel decisions. The research on the glass cliff is conflicting, depending on how organizational performance is

⁴ See examples from (Campbell & Minguez, 2008; Catalyst, 2004; Christiansen et al., 2016; Dezso & Ross, 2011)

defined. When examining accountancy-based measures, such as return on total assets and return on equity, in Fortune 500 corporations, there was no evidence of a glass cliff. (Adams et al., 2009) However, when more subjective forward-looking stock-based measures such as Tobin's Q was considered empirical evidence suggests the appointment of women CEO is negatively correlated with stock market performance in the preceding year. (Bruckmüller, et al., 2014) Shareholders react more negatively to the announcement of a female CEO. (Lee & Hayes, 2007) Given this finding, it would make sense that bias resulting from stereotypes, specifically gender stereotypes, could have an impact on decision making and perceptions driving the market. Stereotypical attitudinal drivers associated with female attributes to leadership include: consideration, transformational, participative, socio-expressive, and people-oriented contrasted with male attributes: structural, transactional, autocratic, instruction-giving, and business-oriented. (Appelbaum et al., 2003) They concluded that women's styles are more effective in consensually driven organizational structures, and the assessment of women's leadership styles as less effective is driven by socialization.

2.3 Performance Measurements

Lastly, the final area of supporting research explored was related to performance measures. Laverty defines short-termism as "a systematic characteristic of an organization that overvalues short-term rewards and undervalues long term consequences." (Laverty, 2004) It is challenging to quantify the measurement of short-termism. We will use multiple performance measures based on previous studies to attempt to quantify short-termism and long-termism.

Tobin's Q captures the value of the firm, rather than the sum of its parts and implicitly includes the expected value of a firm's future cash flows, which are capitalized in the market value of a firm's assets. (Dezso & Ross, 2011) Using accounting performance measurements alone may distort the numbers by differences in risk, tax laws, and subjectivity in the interpretation of accounting regulations. (Wernerfelt & Montgomery, 1988). For these reasons, Tobin's Q has been accepted in the financial literature as a proxy for firm value and has long been favored as a measure of the overall firm's performance in management, economics, and finance.⁵ In a 2016 IMF working paper, Christiansen et al., included a table overviewing the literature on the impact of women on boards, nearly 50% of the papers reviewed use Tobin's Q as a forward looking proxy of performance.⁶

Return on assets (ROA) is a measurement of financial performance that focuses management's attention on the assets required to run the business. In a report published in 2013 by Deloitte⁷, ROA holistically captures financial performance looking at both the income statement performance and the balance sheet making the ROA the most effective measure. According to the study, commonly used metrics such as return on equity are vulnerable to debt leverage, which can obscure the fundamentals of a business. Specifically, this measure is appropriate for our study because it is less susceptible to short-term manipulation. Assets such as plant, property, and equipment are more difficult to manipulate. (Hagel et al., 2013) This report is consistent with scholarly literature

⁵See examples from (Campbell & Minguez, 2008; Campbell & Minguez, 2010; Faccio et al., 2016).

⁶ IMF working paper, Gender Diversity in Senior Positions and Firm Performance : Evidence from Europe (Christiansen et al., 2016) Table A1, page 27 details four studies using Tobin's Q as a performance measurement.

⁷ Deloitte report Success or struggle: ROA as a true measure of business performance (Hagel et al., 2013)

commonly using ROA as a proxy to measure performance.⁸ The firm's assets are managed to maximize shareholder value. (Lavery, 1996) U.S. capital markets pressure managers to achieve short-term performance results by reducing expenditures in research and development (R&D). (Porter & Wayland, 1992) Literature has shown that short-term oriented firms are more likely to exhibit lower discretionary spending, such as research and development. (Brochet et al., 2015; Bushee, 1998) Reducing the level of R&D expense is a proxy for short-termism behavior. (Bushee, 1998)

3. Hypothesis Development:

Considering the previously published literature in long-termism and short-termism, and the challenges in measurement, we propose the following hypotheses:

Hypothesis (1) There is a relationship between the gender of the CEO and corporate short-termism and long-termism.

Hypothesis (2) When the CEO or equivalent is a female, companies will have a long-termism approach.

4. Research methodology:

4.1 Data

This study focuses on S&P 1500, a widely used index of public companies designed to reflect the broad U.S. equities market.⁹ The sample is an unbalanced panel from 2008-2016. Table 1 shows the

⁸ There are four studies using ROA included in an overview of the literature on the impact of women on boards. (Christiansen et al., 2016)

⁹ The S&P 1500 index combines S&P 500 (large companies, considered to be one of the best representations of the U.S. stock market), 400 (mid-cap ranging from \$1.6B to \$6.8B) and 600 (small-cap ranging from \$450M to \$2.1B). This covers 90% of the market capitalization of U.S. stocks ("S&P Composite 1500® - S&P Dow Jones Indices," 2019)

number of observations and gender across time from 2004 through 2016.

[Insert Table 1 here]

The Bloomberg database is the source of CEO gender information about the firms in the sample. The full coverage yearly fundamental data is retrieved via Compustat. As usual, we eliminate firms in regulated industries (SIC codes between 4899 and 5000), financial institutions (SIC codes 5999 and 7000), and government entities (SIC codes greater than 8999). This is standard practice as these segments are highly regulated and different from the industrial sectors. Given the high regulation, there are limitations on their practices impacting their decision making to comply with the rules. The above filters remove 224 financial companies, 49 utilities, and 111 real estate companies from the dataset. Leaving 1,122 companies, 8,066 observations, 6,947 with male CEO or equivalent, 243 with female CEO, and 876 that do not have the CEO data. As a result of the missing CEO data, the analysis is based on 7,190 observations.

[Insert Table 2 here]

Table 2 provides sample data on gender by industry. 3% of the observations represent female CEOs, 86.1% of the observations represent male CEOs, and 10.9% are missing from the dataset. Most of the missing CEO data is in 2008 and 2009. All industries have a higher number of male CEOs. The following GICs consumer discretionary, consumer staples, and communication services represent the only instances in which the proportional percentage of female CEOs exceeds the corresponding percentage of male CEOs. Figure 3 illustrates the gender distribution by FarmaFrench 49 industry classification. When we examine the gender by FarmaFrench

49, all industries have 90% or more male CEOs as compared to female CEOs except for food and guns having 84% and 56%, respectively.

[Insert Figure 3 here]

4.2 Variable of interest

Our main variable of interest is the female CEO. We measure female CEO (or equivalent role) using a dummy variable, the variable takes the value 1 if the CEO is female or 0 if the CEO (or equivalent) is male. The CEO data comes from Bloomberg.

4.3 Performance measurements

We consider three measures of long-term and short-term indicators. Consistent with prior literature, the first performance measurement used in this study to evaluate long-term performance is Tobin's Q, which is defined as the ratio of the market value of a firm's assets to their replacement value (Tobin, 1969).

$$\text{Tobin's Q} = \mu_i + \beta_1(\text{CEO_fem}) + \beta_2(\text{size}) + \beta_3(\text{EMV}) + \beta_4(\text{BL}) + \beta_5(\text{ind}_{dum}^*) + \beta_6(i.\text{fyear})$$

The market value of the equity is calculated by the end of the year stock price multiplied by the common shares outstanding. Book value of debt is calculated by the sum of current debt and by long term debt.

Tobin's Q measures if a firm is relatively over or undervalued. The idea behind Tobin's Q is that better firms create more economic value from a given quantity of assets. We use Tobin's Q as a measure of firm value, a forward-looking measurement to reflect the market's expectation of future earnings, and thus, a good proxy for long-termism focus on decision making. (Wernerfelt & Montgomery, 1988) A lower Q (between 0-1) means the cost to replace

a firm's assets is higher than the value of its stock. That would imply the stock could be undervalued in the market. Higher Q (greater than 1) implies a firm's stock is more expensive than the replacement cost of its assets. That would suggest the firm's stock could be overvalued. Tobin's Q has long been favored as a measure of the overall firm's performance in management, economics, and finance. (Cho, 1998; Demsetz & Villalonga, 2001; Larry & René, 1994) Using accounting performance measurements alone may distort the numbers by differences in risk, tax laws, and subjectivity in the interpretation of accounting regulations. (Wernerfelt & Montgomery, 1988). For these reasons, Tobin's Q has been accepted in the financial literature as a proxy for firm value and has long been favored as a measure of the overall firm's performance in management, economics, and finance.¹⁰

A second profitability measurement is used as a short-term method to quantify performance.

$$ROA = \mu_i + \beta_1 (CEO_fem) + \beta_2 (size) + \beta_3 (EMV) + \beta_4 (BL) + \beta_4 (ind_{dum} *) + \beta_5 (i.fyear)$$

Return on Assets (ROA) is an income statement measurement, and therefore captures profitability at a point in time. ROA is calculated as the ratio of income before extraordinary items to their total assets. Unlike strictly income statement measures, such as EBIT, ROA is more of a holistic measurement that captures both the income statement performance and the assets required to run a business. ROA is less vulnerable as compared with the return on sales, to the kind of short-term gaming that can occur on income statements since many assets, such as property, plant, and

¹⁰See examples from (Campbell & Minguez, 2008; Campbell & Minguez, 2010; Faccio et al., 2016).

equipment, and intangibles, involve long-term asset decisions that are more difficult to tamper within the short term. Since ROA weighs net income as a proportion of assets, earning management through net income would create a smaller ROA. Given ROA includes total assets, it reflects a cumulative outcome of decision making. This provides the advantage of holding management accountable for the cumulative decisions made in employing assets. "ROA provides insight into the quality of decisions and helps challenge the fundamental assumption that these decisions were based on" (Hagel et al., 2013). Accounting performance measurements focus on actions to maximize shareholder wealth, and therefore managers exhibit short-termism. (Laverty, 1996; Marginson & McAulay, 2008).

The third measurement is research and development to serve as a proxy for investment in the future.

$$R\&D = \mu_i + \beta_1(CEO_fem) + \beta_2(size) + \beta_3(EMV) + \beta_4(BL) + \beta_5(ind_{dum}^*) + \beta_6(i.fyear)$$

The R&D is scaled by total assets to understand the investment in the future. This is used as a proxy for long-term thinking. Long-term focused companies spend significantly more on R&D than other companies. (Koller, et. al., 2017)

We use Tobin's Q as a market-driven performance measure. We use ROA as a firm-level performance measure. Lastly, we use R&D as an indicator of long-term orientation. When analyzed in total, these three measures triangulate a picture of decision making. Tobin's Q is to be used as a forward-looking profitability measurement measuring if a firm is relatively over or undervalued. ROA is a lagging performance measure. Given ROA includes total assets, it reflects a cumulative outcome of

decision making. If management uses assets that consistently yield little value, ROA will be negatively impacted. Conversely, if management optimizes assets, ROA will increase. (Hagel et al., 2013) "ROA provides insight into the quality of decisions and helps challenge the fundamental assumption that these decisions were based on (Hagel et al., 2013)". Research and Development expenditures are used to evaluate the investment in the future. We regress these three measures with the gender of the CEO, along with several commonly used control variables.

4.4 Control variables

We use a broad set of control variables, many of which are commonly found in research. Size is represented by the logarithm of total assets. Equity market value is calculated by the end of year stock price multiplied by common shares outstanding. Book leverage is total debt over total assets. We use FarmaFrench 49 for industry fixed effects and time. All variables are winsorized at the 1st and 99th% percentile to remove the influence of outliers. All variables are described in Table 3.

[Insert Table 3]

4.5 Descriptive Statistics

Table 1 illustrates the low number of female CEO observations relative to male CEOs from 2008-2016¹¹. In 2008-2010 the number of female observations increased 3.5 times. However, there are many missing CEO gender observations in 2008 and 2009. Figure 1 shows the percentage of women CEOs and male CEOs over 2008-2016. In 2008 women represented less than 1% of the CEOs in our dataset. The

¹¹ Much of the missing data for Gender CEO is in years 2008 and 2009.

percentage of women CEOs increases over time; however, in 2016, female CEOs are still less than 5% of the sample.

Figures 1 and 2 show gender of the CEO as a percentage of total. Figure 2 illustrates all GIC industry types have more male CEOs. However, the consumer goods and communication represent the only instances in which the proportional percentage of female CEOs exceeds the corresponding percentage of male CEOs. Figure 3 illustrates the gender distribution by FarmaFrench 49 industry classifications. When we examine the gender by FarmaFrench 49, there are no industries that have a more significant number of female CEOs. All 49 industry types have more than 90% male CEOs except for food and guns having 84% and 56%, respectively.

[Insert Figure 1 and Figure 2]

In table 4, we see that, on average, the firms that have female CEOs are slightly larger in size as measured by the log of total assets. The firms with female CEOs, on average, have a 34% higher Equity Market Value (EMV) than the average firms with male CEOs. The ROA is slightly better on average in firms with female CEOs versus males. The average R&D expenditure scaled by assets is the same for firms with female and male CEOs.

[Insert Table 4]

5. Results:

To assess the relationship between CEO gender and long-term performance, short-term performance, and investment in the future, we start with the forward-looking performance measurement. Table 5 shows Tobin's Q is regressed with industry and time fixed effects to control for unobserved variables across industry and time. We find that firms with a female CEO have a lower Tobin's Q compared

to male CEOs. Thus, implying that firms led by female CEOs are under-valued in the market. The market value is lower than the replacement cost of the assets. Tobin's Q does not include some important intangible assets, such as investment in research and development. The lower Tobin's Q for female-led firms reflects the market's perception of the firm's earnings, growth rate, risk, and policies in a negative light. This finding is consistent with Bruckmüller, et al., finding where the appointment of women CEO was negatively correlated with stock market performance in the after the announcement. (Bruckmüller, et al., 2014) In female led firms, we suggest stock price is not appreciating as expected from the finding from the McKinsey white paper from 2017 suggested (Barton, et. al., 2017) due to gender bias.

[Insert Table 5]

Similarly, ROA is regressed with industry and time fixed effects to control for unobserved variables across industry and time. We also find that firms with female CEOs have a negative effect on ROA. Thus, a female CEO is associated with lower ROA compared with firms that are led by male CEOs. As ROA is an accounting performance measure, it measures actions leading towards maximizing shareholder wealth. Therefore, it is consistent that female CEOs have lower ROA. They tend to lead less profitable companies. ROA can either increase or decrease as a result of managerial decision making. A high ROA could be attributed to underinvestment or strict cost control. We postulate those female CEOs are selected when the company is not performing well; once they assimilate, they manage with a focus on long term growth. Given ROA is a lagging performance measure, long term decisions such as investment in research and development would not be reflected in the income statement until a later timeframe.

R&D scaled by total assets is regressed with industry and time fixed effects to control for unobserved variables across industry and time. We find female CEOs spend more on R&D compared to male CEOs. This implies the female CEOs are associated with having a longer-term view of company performance.

These findings are consistent with the results of studies that have examined female representation in top management and boards improve performance¹². When all three factors are examined together, female CEOs have lower Tobin's Q, lower ROA, and spend more on R&D. We interpret our results as the market tends to undervalue female CEOs. They have been asked to lead low performing firms, but when female CEOs take the mantle, they show an emphasis on long-term investment; thus, the results are consistent with females having a more long-termism approach when compared with male CEOs.

Given the results of a whitepaper published by McKinsey¹³, 75% of the U.S. market is held by buy-and-hold investors who want long-term value for the companies they invest in. The lower Tobin's Q female CEO's experience, as compared with male CEOs, implies investors view female CEO gender in a negative light. They are undervalued. The McKinsey study found empirical evidence to support companies with a long-termism approach outperforms those with a short-termism approach.

When considering these results with the literature in the 'glass cliff,' women take on CEO roles at firms in times of poor company performance. (Ryan & Haslam, 2007; Ryan et al., 2011) According to their work, women assumed emotional sensitivity, relational style,

¹² Scholarly research examples include (Campbell & Minguez, 2008; Campbell & Minguez, 2010; Dezso & Ross, 2011; Khan & Vieito, 2013). Industry publications examples include (Catalyst, 2004; Christiansen et al., 2016)

¹³ Barton, et al., 2017, Measuring the Economic Impact of Short-termism, McKinsey Global Institute.

and interpersonal skills, which might be more highly valued in struggling organizations that face difficult personnel decisions.

5.1 Endogeneity issue

We have concerns about endogeneity, given that females systematically segregate themselves into specific types of firms that are different from those employing male executives. This could bias our results.

In addition, firms that select a female CEO may have characteristics conducive to hire more female leaders, i.e., a third endogenous factor driving the relationship. However, given only 3% of the dataset represents female CEOs, this is particularly challenging.

6. Summary and Conclusions:

In this paper, we develop a model to begin to quantify short-termism or long-termism using a panel of S&P 1500 companies from 2008 through 2016 by triangulating a forward-looking measure of firm value, a current looking measure of firm financial performance, and current spending levels on development for future sustainability or growth. We offer new insight through the lens of CEO gender to add to the vast gender literature¹⁴ and contribute to the growing short-termism literature¹⁵.

We find that in the S&P 1500, companies with female CEOs experience lower Tobin's Q, lower ROA, and spend more on R&D as compared with male CEOs. We interpret these results to suggest that female CEOs

¹⁴ The published research on gender students is extensive (Adams et al., 2009; Adler, 1993; Appelbaum et al., 2003; Campbell & Minguez, 2008; Campbell & Minguez, 2010; Christiansen et al., 2016; Dezsó & Ross, 2011; Faccio et al., 2016; Noland et al., 2016; Adler, 2001) for further details.

¹⁵ Examples of literature of short-termism (Barton, et al., 2017; Brochet et al., 2015; DesJardine, 2016; Laverty, 1996; Marginson & McAulay, 2008; Olesinski et al., 2014).

have more orientation towards a long-termism approach. Female CEOs are judged unfairly by the market. They tend to lead lower-performing companies but, our study suggests, female CEOs think with a long-termism orientation and invest more in R&D than male CEOs, despite the market judges them unfairly as demonstrated with a lower Tobin's Q.

Our study complements 'glass cliff'¹⁶ research and adds a long-termism perspective to be considered in future studies. Our study empirically confirms the journey of CEO Mary Barra at General Motors. Despite her starting her role as CEO while GM was in turmoil, she has a long-termism viewpoint, investing heavily in R&D, yet GM is undervalued in the market.¹⁷ Our results show, female CEOs, invest more in R&D and have lower ROA and Tobin's Q than compared with male CEOs in S&P 1500. Additional research is needed to examine more dynamic quantitative and qualitative models to include behavioral elements and stereotype bias into the analysis. In future research, we hope to dive deeper into the specific industry segments to determine any insight to add to this work. These and other questions suggest the need for more research.

¹⁶ (Ryan & Haslam, 2007) suggests that women are more likely than men to be appointed as leaders in times of poor company performance.

¹⁷ CEO Barra started her career at GM in 1980, GM declared bankruptcy in 2009, 2014 CEO Barra was appointed CEO, 2015 over 30 million recalls, millions of dollars in settlements and fines, 2018 close plants restructure that cost up to \$3.8 billion, company is transforming planning to launch 20 new electrified vehicles by 2023. Yet GMs stock price has languished for years. (<https://www.businessinsider.com/gm-mary-barra-management-helped-save-automaker-2018-10>)

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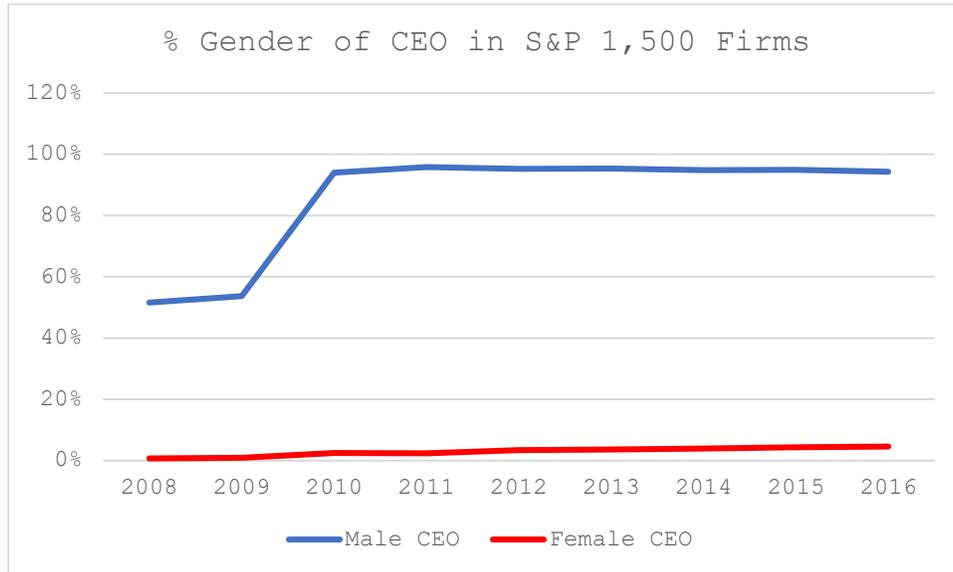
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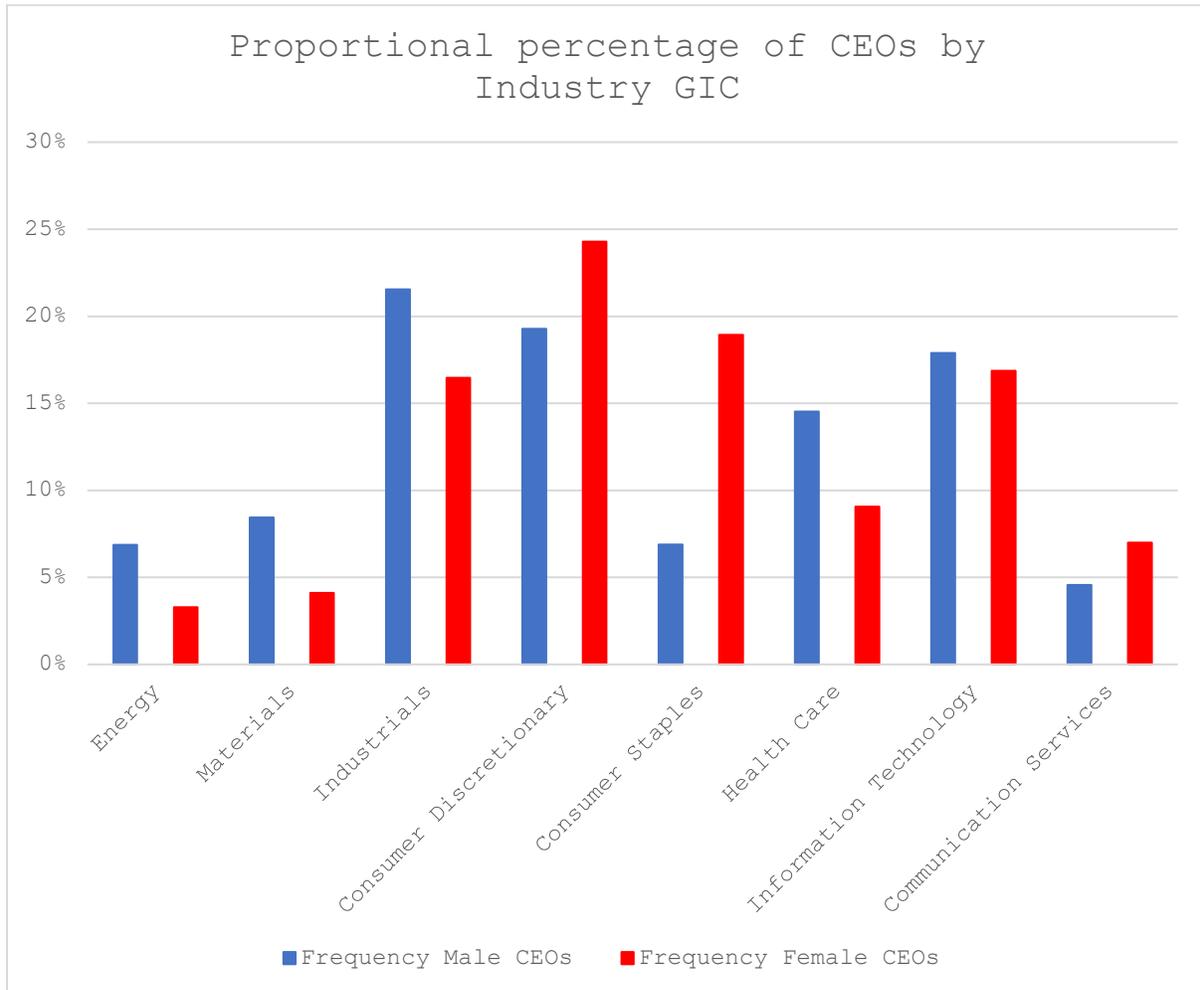
Figure 1: Gender of CEO in S&P 1,500 Firms over time (2008-2016)



Source: Bloomberg database

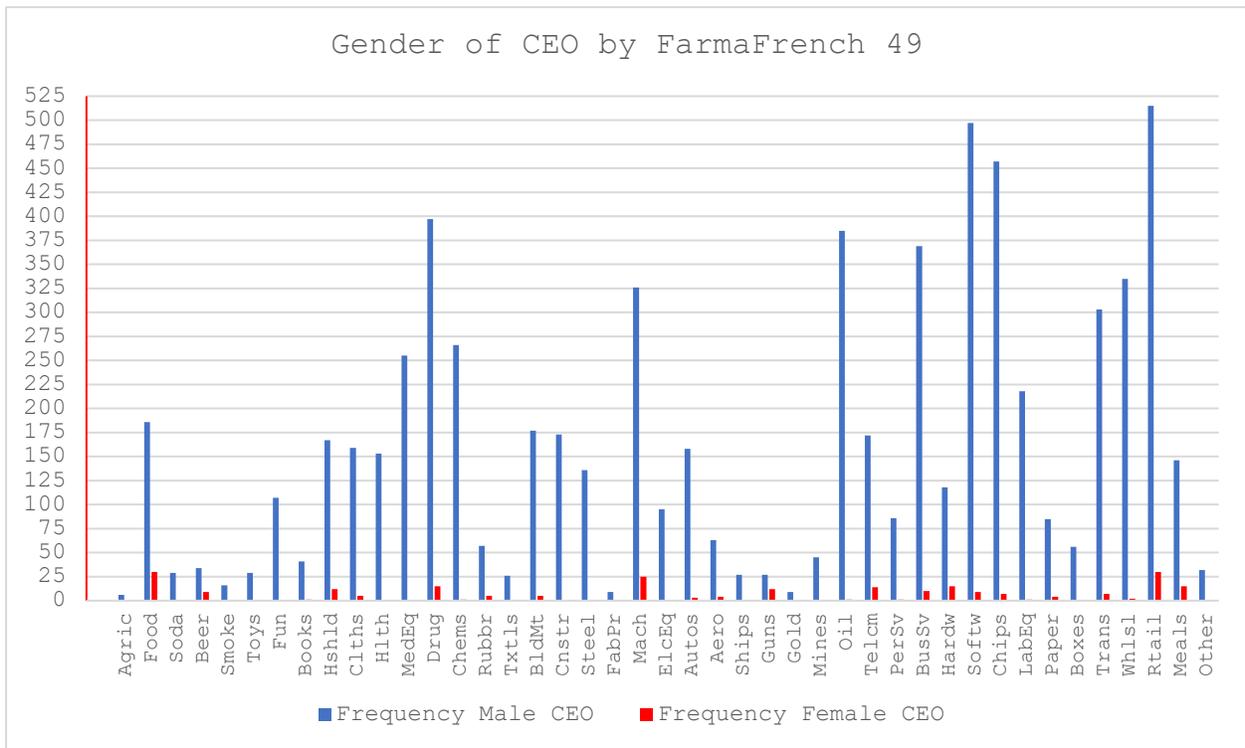
In 2008 and 2009 nearly half the observations in the data set were missing the CEO gender.

Figure 2: Proportional percentage of CEOs by Global Industry Code



Source: Bloomberg and Compustat databases

Figure 3: Number of CEOs by Gender by FarmaFrench 49 Industries



Source: Bloomberg and Compustat database

Table 1: Gender observations by year

Year	Total Obs	Male CEO	Female CEO
2008	839	433	6
2009	845	454	8
2010	854	803	21
2011	867	831	21
2012	888	846	30
2013	908	866	33
2014	929	881	37
2015	958	910	42
2016	978	923	45
Total	8,066	6,947	243

Source: Bloomberg database

In 2008 and 2009 nearly half the observations in the data set were missing the CEO gender.

Table 2: Sample Section - Bloomberg / Compustat sample 2008-2016

Industry	Number of Firms	%	Frequency CEO Gender	%	Frequency Male CEOs	%	Frequency Female CEOs	%
Energy	89	5.9%	538	6.7%	477	6.9%	8	3.3%
Materials	94	6.2%	684	8.5%	586	8.4%	10	4.1%
Industrials	223	14.8%	1,730	21.4%	1,497	21.5%	40	16.5%
Consumer Discretionary	216	14.3%	1,542	19.1%	1,339	19.3%	59	24.3%
Consumer Staples	74	4.9%	586	7.3%	479	6.9%	46	18.9%
Health Care	173	11.5%	1,151	14.3%	1,009	14.5%	22	9.1%
Financial	224	14.9%	Not included ^a					
Information Technology	198	13.1%	1,462	18.1%	1,243	17.9%	41	16.9%
Communication Services	55	3.7%	373	4.6%	317	4.6%	17	7.0%
Utilities	49	3.3%	Not included ^a					
Real Estate	111	7.4%	Not included ^a					
Total Companies	1,506							
^a Heavily regulated industries	384	25.5%						
Total Included in Study	1,122		8,066		6,947	86.1%	243	3.0%

Source: Bloomberg and Compustat databases

^a Eliminates utilities (SIC codes 4899-5000), financial firms (SIC codes 5999-7000), and governmental entities (SIC codes greater than 8999)

Table 3: Variable construction using database mnemonics

Table 3 displays the definition of the variables employed in this paper using the original database mnemonics. CEO Gender was retrieved from Bloomberg and merged with the Compustat database.

Variable Name	Description
<i>CEO_Fem</i>	<i>CEO =1 if female, 0 otherwise</i>
<i>at</i>	<i>total assets</i>
<i>cscho</i>	<i>common shares outstanding</i>
<i>dlcc</i>	<i>current debt</i>
<i>dlt</i>	<i>long term debt</i>
<i>dvt</i>	<i>total dividends</i>
<i>ib</i>	<i>income before extraordinary items</i>
<i>i.fyear</i>	<i>fiscal year data</i>
<i>prcc_f</i>	<i>end of year stock price</i>
<i>xrd</i>	<i>research & development expenditures</i>
<i>Size</i>	<i>log(at)</i>
<i>BL Book leverage:</i>	<i>(dlcc + dlt)/at</i>
<i>EMV Equity Market Value:</i>	<i>(prcc_f * cscho)</i>
<i>ML Market leverage:</i>	<i>(dlcc + dlt)/(prcc_f * cscho + dlcc + dlt)</i>
<i>Q Tobin's Q:</i>	<i>(prcc_f * cscho + dlcc + dlt)/at</i>
<i>R&D expenditures:</i>	<i>xrd/at</i>
<i>ROA Return on Assets:</i>	<i>ib/at</i>

Table 4: Summary Statistics

Total data set					
Variable Name	Observations	Mean	Std. Dev.	Min	Max
Industry	8,066	5,570.28	2,914.21	79.00	10,608.00
Size	8,066	7.77	1.50	2.04	10.16
EMV	8,066	11,958.28	36,251.00	5.78	626,550.40
BL	8,066	0.22	0.19	-	1.00
R&D	8,066	0.03	0.07	-	0.63
ROA	8,066	0.05	0.13	(3.06)	0.72

CEO-Fem = 0					
Variable Name	Observations	Mean	Std. Dev.	Min	Max
Size	6,947	7.77	1.48	2.51	10.16
EMV	6,947	12,858.93	38,128.24	11.25	626,550.40
BL	6,947	0.22	0.19	-	1.00
R&D	6,947	0.03	0.06	-	0.63
ROA	6,947	0.05	0.11	(3.06)	0.72

CEO-Fem = 1					
Variable Name	Observations	Mean	Std. Dev.	Min	Max
Size	243	8.06	1.55	4.71	10.16
EMV	243	19,379.66	37,818.77	141.90	214,031.80
BL	243	0.22	0.18	-	1.00
R&D	243	0.03	0.07	-	0.37
ROA	243	0.06	0.08	(0.31)	0.31

CEO-Fem = .					
Variable Name	Observations	Mean	Std. Dev.	Min	Max
Size	876	6.83	1.40	2.04	10.16
EMV	876	2,757.10	8,403.41	5.78	77,569.97
BL	876	0.21	0.21	-	1.00
R&D	876	0.04	0.09	-	0.63
ROA	876	(0.00)	0.20	(2.51)	0.32

Table 5: Results

Variables	Models		
	Tobin's Q	ROA	R&D
CEO Female	-0.2084*** (-2.71)	-0.0118* (-1.65)	0.0060** (1.91)
size	-0.216*** (-18.56)	0.0112*** (0.00)	-0.0073*** (-15.28)
EMV	4.63E-06*** (11.11)	1.94E-07*** (5.02)	5.14E-08*** (3.01)
BL	(0.43) (-0.52)	-0.1481*** (-19.15)	0.00 (0.48)
Obs	7,190	7,190	7,190
Adj R2	0.25	0.12	0.43
Year FE	YES	YES	YES
Firm FE	YES	YES	YES

Notes: t-stat is in (), statistically significant at 1% level ***, 5% level **, and 10% level *